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# Maritime trade and port evolution in a socialist developing country: Nampo, gateway of North Korea

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## Abstract

This paper is an empirical attempt to evaluate the importance of maritime transport in North Korea. The study refers to port development issues in the socialist developing countries, in terms of constraints and advantages for ports, and proposes some analysis based on Nampo, the main international trading port city in North Korea. Although it faces a number of difficulties such as trade embargo, energy shortages, transport infrastructure dereliction and unstable diplomatic relationships, North Korean trade activity has been maintained. However, the participation of individual ports in these general trends is not well-known due to the scarcity of data. An analysis of cargo vessel movements at North Korean ports during the last two decades is provided, helping to estimate the importance of ports in foreign trade. It appears that the nature and evolution of port activity do not totally match either the Soviet or socialist developing country models, but proceeding to more on the latter. Some comparison with foreign cases of port concentration and port-related industrial development allows for addressing some implications for Nampo. Finally, the importance of free-trade zones and connection to the transport chain is mentioned for the success of the North Korean gateway.

*Keywords: DPRK, Maritime transport, Nampo, North Korea, Port evolution*

## 1. INTRODUCTION

Located 40 kilometres from Pyongyang, the function of Nampo is to serve North Korea's core region, its main hinterland. However, port activities in North Korea are hampered by several internal and external constraints. Referring to the theory of the socialist developing countries explored by Jo and Adler (2002a), the question of ports combines elements of both socialist and developing countries. Although studies on ports in developing countries "are few and dated" (Airriess, 1989), they can be compared to the North Korean case for a number of issues, such as port concentration, rapid port-city growth leading to lack of space and congestion, and cumbersome regulations (Taaffe et al., 1963; Hilling, 1977; Hoyle, 1981). Port studies in socialist and transitioning countries are also few, but they allow for the formulation of several key issues such as the prevalence of railways in the modal split, the dominance of bulky products for port traffics and the preferential trade relationships among socialist countries (Ledger and Roe, 1996; Thorez, 1998; Jauernig and Roe, 2000 and 2001; Brodin, 2000 and 2003). Both models also emphasize the low level of modernization, illustrated by the lack of mechanical handling facilities (e.g. containers), and the managerial limitations resulting from political factors, such as bureaucracy and protectionism. Moreover, limitations of inland transportation and port hinterlands are a common trend of Asian ports (Ducruet and Jeong, 2005). Although the Chinese experience is interesting as it combines some elements of socialist regime and capitalist economy, it might not be fully relevant for the North Korean case, given the very dependence of Chinese industries on the Hong Kong global financial and port hub until 1995 (Wang, 1998).

The task of this paper is to examine to what extent such factors apply to North Korea, raising the

hypothesis that this country might produce a unique case, given its long period of isolation, tight diplomatic relationships with the outside world, the importance of military considerations, and the self-reliance ideology.

The first section introduces Nampo and the recent North Korean reform policy, with an overlook of the North Korean transport system. The second section proposes an analysis of cargo vessel movements over the last two decades (1985–2005) at North Korean ports. It verifies the relevancy of Soviet and socialist developing countries's models for North Korea and notably Nampo. The fourth section addresses implications about the future of Nampo as the gateway of North Korea. Finally, concluding remarks are given about the place of North Korea in port planning studies.

## **2. THE IMPORTANCE OF NAMPO IN NORTH KOREAN CHANGE**

### **2.1 Institutional change and territorial reorganization**

Several reports and studies have addressed the economical and political changes in North Korea in recent years, demonstrating very diverse opinions. Some authors think that many of the regime' s economic changes and diplomatic manoeuvres “ may prove self-defeating” in the long run (Sandhu, 2003), while others depict the reform process as “ underway and probably unstoppable ” (Beal, 2004).

#### **2.1.1 Reforms and foreign investment**

Since the mid-1990s, North Korea has undertaken a number of actions to evolve in a context of crisis, which was accentuated by floods and starvation. The economic management improvement measures in the 1990s moved toward a reformist behavior, notably from the June 15<sup>th</sup> Joint Declaration in 2000 between the two Koreas, and the announcement of the “ New Way of Thinking ” in 2001. Since July 2002, the adjustment of consumer prices, wages, foreign exchange rates and the expansion of the autonomy of businesses have been key implements of the new policy direction. After March and June 2003, respectively, terms such as “ market” and “ reform” were officially recognized within the new “ practical socialism” policy, echoing the Chinese “ market socialism ” (Ministry of Unification in South Korea, 2005). The consequence is an increase in individual commercial activities (shops, stores) and the development of a family farming system, based on a greater self-governing power for factories and companies.

Since the Law on Joint Ventures in 1984, some achievement in the field of foreign investment can be seen by the opening and operation of the Gaeseong Industrial Complex, which has welcomed South Korean factories since 2002. Former efforts, such as the Sinuiju Special Administrative Region (SAR) in the North Pyongan province, close to the Chinese city of Dandong, and the Rajin-Seonbong Special Economic Zone (Raseon) in the North Hamgyeong province, faced difficulty in enticing investors due to their remoteness and mismanagement. However, these two experiences are still promising, given the growing Chinese interests in North Korean investment. Discussions are in progress about the designation of the Nampo port and the outlying Wawoo district as a Special District because this area has the advantage of being close to Pyongyang, the country' s major market.

#### **2.1.2 Nampo, fastest growing city of North Korea**

Its proximity to Pyongyang has fostered Nampo' s growth. Table 1 clearly shows that among North Korean cities, Nampo has been the fastest growing since the 1970s, while other cities have generally shown a more typical evolution. This illustrates the sudden key importance of Nampo in North Korean regional development.

[INSERT TABLE 1 ABOUT HERE]

Another aspect of Nampo' s importance is its role as a gateway, reinforced recently through the construction of the new Songgwan terminal in 2001, which is located at the far west end of Nampo along the Daedong River. This confirms, in some ways, Bird' s (1963) model of port evolution, showing new port facilities shifting downstream, from the congested river port city' s inner area,

to maintain sufficient accessibility. Nampo is constrained by the West Sea Barrage (Figure 1) and also by rapid urban growth. However, additional container facilities have been built within the inner port using foreign investment (Lloyd's Register, 2006).

[INSERT FIGURE 1 ABOUT HERE]

In fact, the inner port of Nampo is constrained within a high density (Figure 2). This situation has been worsened by the spread of urbanization in the last thirty years, leading to port improvement. Songgwon terminal can allow escaping from urban density, with goods bypassing the agglomeration via the North, and accessing more easily the newly built factories (e.g. Pyonghwa Automobiles, Dae'an Friendly Glass Factory) as well as Pyongyang, the major market. The high density also causes urban sprawl outside of the Nampo central city. Industrial activities have shifted to the surrounding areas of Nampo, such as Pyonghwa Automobiles (Figure 2). Such development was also justified by the lack of container facilities along the west coast. This confirms that the search for economic efficiency has taken precedence over ideological and military considerations (Jo and Adler, 2002a).

[INSERT FIGURE 2 ABOUT HERE]

## **2.2 Ports and the North Korean transport system**

### **2.2.1 A modal split disfavoring ports**

As a result of the economic crisis which started in the 1970s, the transportation sector has stagnated because of the deterioration of infrastructure and the lack of energy, as 70% of power generation facilities are severely damaged (Ministry of Unification, 2006).

The strategy of former president Kim Il-Sung to develop a “ fully integrated and containerized transport system” was favoring land transport rather than ports, although maritime transport was given strategic importance in the 7-year Development Plan of 1961, “ to ensure coastal transport, expand railway connections and, in particular, improve foreign trade using our ships” (Ahn, 2003). Consequently, port facilities have stagnated except for some investment in oil berths in the 1970s and storage facilities in the 1980s. This is reflected in the modal split, similar to the Soviet model: 73.8% for railways (93% on a ton-kilometer basis), 18.3% for roads and 7.9% for sea transport in 1989 (Tsuji, 2005). Although it is approximate and should be researched more, recent estimations indicate 70% for railways, 17% for roads, 10% for sea transport and 3% for air transport (Roussin and Ducruet, 2006). Thus, “ North Korea’ s maritime transportation is relatively poor mainly due to its heavy dependence on railway transportation [but] still North Korean roads are 93% unpaved ” (Bang, 2004). Notably, North Korean ports have suffered from limited foreign trade and the deterioration of infrastructure and capital stock (Yoon and Babson, 2002), as well as from military considerations, which have hampered commercial and industrial strategies.

### **2.2.2 High logistic costs at land and sea**

The poor conditions of inland transport tend to isolate ports from their hinterlands, limiting them to the local industries, what is partly shown in Figure 3. North Korean regions are disconnected, resulting in the imbalance of transport activity: 30% in South Pyongan, 10% in North Pyongan, 24% in North Hamgyeong, and 17% in South Hamgyeong (Tsuji, 2005). It is estimated that around 80% of North Korean exports pass through Sinuiju. However, there is a hardship to get accurate estimations of the volume and modal distribution of border trade.

[INSERT FIGURE 3 ABOUT HERE]

The main constraint of ports, as observed in other developing countries, is their governance, torn between open trade and military affairs. For example, South Korean companies such as the state-owned Korea Container Terminal Authority (KCTA), the shipping companies Hansung and Kook Yang Shipping have failed to modernize Nampo port through joint ventures for unknown

reasons (Yonhap News, 2005). In addition, “ the present system of maritime transport presents a number of issues, including excessive logistics costs and prolonged shipping time” (Ahn, 2002). A round trip between Incheon and Nampo takes 24 hours for 100 kilometers and costs as much as the route to Europe, US\$1,000 for one TEU (Ahn, 2001), although this cost is said to have fallen to US\$250 in recent years (Choe et al., 2005). Moreover, North Korea still collects exorbitant port-entry fees, and the Korean companies involved in processing trade spend 40% of their manufacturing costs on logistics. Since 45% of containers sent to the North return empty (Forster-Carter, 2001), freight charges between North and South Korea are higher than other routes to China.

### **3. NAMPO AND THE EVOLUTION OF THE NORTH KOREAN PORT SYSTEM**

The question of the relevancy of Soviet and socialist developing country models can be answered by looking at the evolution of maritime activity on national and local scales.

#### **3.1 The persistence of the Soviet model**

##### **3.1.1 A parallel evolution of shipping and trade**

First, it is possible to highlight the evolution of North Korean maritime activity by using the cargo vessel movements of all registered seagoing vessels over 100 gross tons, provided by Lloyd’ s Marine Intelligence Unit, the world’ s major source for shipping information. However, the summation of the capacity of the ships calling to North Korea might not always match the real amount of loaded and unloaded cargo. As showed in Figure 4, the highest sea trade activity (1985–1987) marks the heyday of DPRK, with a growing foreign trade until 1988. The impact of the USSR collapse is visible from 1991, together with the period of isolation and stagnation (1992–1999), the recent openness towards South Korea after the June 2000 summit and the reforms of 2002 (2000–2005). Then, like post-soviet countries, economy was struck hard and faced difficult recovery in a context of globalization.

[INSERT FIGURE 4 ABOUT HERE]

An estimation of the share of sea trade is proposed, using a ton-dollar ratio of \$US 250 by deadweight ton. This ratio is based on the comparison of total and sea trade with Japan and South Korea, for which maritime transport is dominant. Specific trends are better illustrated, such as the cuts in oil shipments from Russia (1985–1988), the Rajin-Seonbong free-trade zone experiment (1991–1992), the sustained trade with Japan at the time of isolation (1993–1997), humanitarian aid (1998–2002), and the rise of trade with China by land from 2003.

##### **3.1.2 The limited importance of maritime trade**

According to the estimation, the average share of trade by sea is 26.7% over the period, almost one-third of total foreign trade. This has increased from 23% (1985–1990) to 25% (1991–1997) and again to 30% (1998–2005), indicating that maritime transportation in North Korea may have been largely underestimated. However, the value of the cargo is not fixed and varies according to the products shipped. In order to adjust the total tonnage to the value of the goods, the method of “ weighted tonnage” proposed by Charlier (1994) for European ports can be applied. Because container handling facilities lack in North Korea (Kim, 2005), container and roll-on/roll-off traffic is chosen for reference as it is the most technologically advanced. Other traffics are adjusted with a reducing coefficient of twelve for oil, nine for other liquid bulk, six for solid bulk, and three for general cargo. When transferred to dollars, the share of maritime trade is only 7% on an average basis, oscillating between 10 and 20 percent. Thus, North Korea can be said to still follow the Soviet model of transportation, with reduced importance of ports and maritime trade.

##### **3.1.3 The preference to socialist trade and bulky products**

Another aspect of the Soviet model is preferential trade with countries of the same political family, i.e. within socialist countries. This was particularly true for North Korea although the share of

socialist countries in total trade has decreased from 100% in 1955 to 78% in 1970 and 70% in 1985, while the share of capitalist countries has increased from 4% in 1960 to 20% in 1985, and the share of developing countries has increased from 2.5% in 1970 to almost 10% in 1985 (Hughes, 1999). According to maritime linkages (Table 2), the importance of socialist countries (i.e. China, Russia, and Vietnam) is quite low along the period. However, the figure is distorted because of the data source, which only provides vessel movements for the first port of call before and after North Korea. For example, the importance of Singapore and Taiwan comes from their relay functions for most vessels passing through the Malacca Strait. Goods may be shipped to and from other destinations through these hubs. Also, this might reflect that Chinese and Russian trade occur mostly by land transport through the border areas. In addition, although trade in 2004 with Thailand (8.1%), India (3.8%), and Europe (7%) is substantial, their share by sea is under one percent. South Korea has replaced Japan as the main partner since 2003. The main trend is a growing spatial contraction of distance, because of ageing North Korean fleet and increased isolation from the world economy.

[INSERT TABLE 2 ABOUT HERE]

In terms of the goods shipped, the dominance of general cargo (also defined as 'miscellaneous goods') can be explained by the limited importance of oil shipments (Figure 5). During the collapse of USSR, oil shipments have stopped, but their increase between 1998 and 2004 is caused by humanitarian aid and Chinese support. Liquid and solid bulks together occupy half of the shipments, with 45.6% on an average basis. As a result, manufactured goods oscillate between 1% and 6% only along the period, with no noticeable increase. From this analysis, it is possible to assess the persistence of a Soviet model both in terms of modal split, goods transported and trade relationships, as North Korean sea transport does not give sufficient clue of its shift to developing or transition country trends.

[INSERT FIGURE 5 ABOUT HERE]

### **3.2 Nampo case and the developing country model**

#### **3.2.1 A limited port concentration**

A common feature of developing countries is to concentrate most of their trade activity in one main load centre, which is the interface between the country's core region and the world. Such trend often results in congestion problems for the port and the adjacent city, along with the decline or disappearance of smaller ports, because of land transport limitations with the core region and lack of investment (Taaffe et al., 1963). Table 3 gives an overlook of this phenomenon, where island ports have been excluded due to obvious geographical factors. Values over 100 indicate the importance of transshipment for some ports. In most cases, the share of national seaborne trade has increased between 1990 and 2000, or has remained stable at high values.

[INSERT TABLE 3 ABOUT HERE]

Although Nampo is the natural gateway of Pyongyang, North Korea's primate city and core region (Jo and Adler, 2002), its share in the country's maritime activity has been irregular over the last two decades (Figure 6). The importance of other main trading ports is around 40% on an average basis. Thus, North Korean maritime activity has been maintained outside the core region, probably because of the sustain of Russian and Japanese trade for the East coast. In fact, Nampo has reached over 50% of maritime trade only between 1997 and 1998 and between 2003 and 2004, while it has exceeded 20% of total trade only in 1998 and 1999, with only 5% when adjusted to weighted tons. This confirms the importance of border trade by land transport rather than the importance of other ports.

[INSERT FIGURE 6 ABOUT HERE]

### 3.2.2 A growing port concentration

Although the different estimations of the importance of Nampo are low, the trend of concentration has an average annual growth rate of 3.8% over the period. Furthermore, the traffic of East coast ports is inflated by humanitarian aid. Another possibility is to distinguish between the concentration of types of goods (Figure 7). Although Nampo was not the main port of North Korea until the collapse of the Soviet Union, it has concentrated most commodities since 1994, except for liquid bulks. Especially, the concentration of container traffic reveals an important trend of developing countries, which is the predominance of one port for modern berthing infrastructures and normalized handling facilities. This is notably true after the creation of the new Songgwan terminal in 2001. Thus, Nampo has become North Korea's load centre for the most valuable goods (general cargo, containers). The decrease of humanitarian shipments and the worsening diplomatic relationships with the outside world might reinforce this trend, as East coast ports might not be able to keep the pace, cut from both the core region and the traditional partners. Still, a number of stakes remain to be overcome, such the integration of Nampo in a larger logistic chain at the scale of the Korean peninsula, Northeast Asia and the world.

[INSERT FIGURE 7 ABOUT HERE]

## 4. THE FUTURE OF NAMPO AS NORTH KOREAN GATEWAY

### 4.1 Port connection to the transport chain

The particular location of North Korea is definitely an advantage, but its limited openness hampers the trade relationships among its neighbours. As a result, South Korea is an island with 99% of its trade occurring by sea. Studies on Northeast Asian transportation give very diverse views on the role of North Korean ports. For example, Kovrigin (2002) praises the "new silk road" running east through Rajin as it would lower the delivery time and cost from South Korea to Europe by 50 percent and 30 percent, respectively. Gao et al. (2005) lower the importance of a trans-Korean land bridge and are more optimistic about future growth in the Tumen area. Inversely, the Ministry of Unification in South Korea (2006) is very optimistic about future Korean trade passing through North Korea by land.

In fact, North Korean ports are diversely positioned within the transport chain. For example, China plans to develop the Rajin port after North Korea leases the second pier for 50 years in order to facilitate the import and export of goods to North China directly by sea (Cotton, 1996). The creation of a logistics free-zone in Namyang, Onsong County, at the border along the Tumen River, is a complementary node for inter-firm cooperation among Japanese, South Korean and Chinese companies located in Jilin province (Hankyoreh, 2006). The ongoing improvement of the link between Rajin and Hunchen, China, shall reduce frequent truck accidents in this region (Tsuji, 2004). Also, Rajin is well located for Japanese transit trade, as the shortest and cheapest path between Japan and the continent. However, such potentials are not yet fully reflected in recent traffic figures (Figure 8), although one can notice a slight increase since 2003. Still, there is a possibility to become a gateway for Northeast Asia, but low population and economic activities, as well as distance to Pyongyang, are constraining Rajin's function as North Korea's gateway.

[INSERT FIGURE 8 ABOUT HERE]

Comparatively, Nampo is better connected to land infrastructure, with the 10-lane highway to Pyongyang that continues, with a lower technical quality, to Gaeseong and Wonsan. However, the transport chain is limited to Pyongyang until roads are improved in this country, notably near Sinuiju to the north and towards the Gaeseong Industrial Complex (GIC) to the south. Political factors are more important in this case than economical ones. Internally, the North Korean government gives priority to the railway network, because the road network is wider, more costly and less adapted to

carry the goods generated by mines and heavy industry. Furthermore, the government intends to limit road transport in order to better control circulation flows, to limit the budget expenses for buying vehicles and oil, as well as to protect the environment. Externally, the trade embargo decided by the Wassenaar Agreement in 1996 does not allow North Korean goods to be exported directly from this country. This harms the usage of western ports such as Haeju and Nampo to exporting finished products. Instead, semi-finished goods are sent to South Korea from GIC despite land transport hardships and logistic costs through the DMZ. For Wonsan, travel conditions are not perfect due to frequent tunnel obstruction and poor road quality. Thus, huge gaps between South and North Korean transportation systems are hampering their fruitful cooperation of land transportation (Kim, 2006).

#### **4.2 Ports and special economic zones**

When inland transportation lacks, economic development is still possible when investment is made around the port area. The usual strategy is to build free-trade zones adjacent to ports, such as Kaohsiung in Taiwan in 1966, Masan in South Korea in 1970, Shenzhen in China in 1978, and so on. This trend is not limited to formerly developing Asian countries, but also applies in transition countries, and the interplay of ports and local industrial development for export and transit trade has been an important strategy to support the shift from a socialist to a market economy, coping with infrastructure hardships. The subject is too wide to be covered in this paper, so a comparison between Baltic and North Korean ports is provided (Figure 9).

[INSERT FIGURE 9 ABOUT HERE]

This clearly shows the fact that Nampo is the only port comparable to Baltic ports, given the pattern of traffic evolution and a better recovery than other North Korean ports since the late 1990s. North Korean ports were more dynamic 20 years ago, while Baltic ports have reached their highest activity recently, well beyond their former activity under the Soviet rule. Baltic ports could profit from the lack of major topographical obstacles for transport infrastructure and their intermediate position between Russia and Western Europe (Estonia, Latvia, and Lithuania). Moreover, the difficulty accessing the continent by railways, due to differences in track gauges, increases the importance of maritime transport (Spens et al., 2004; Kovacs and Spens, 2006). This is reflected in the creation of industrial parks around port areas and the liberalization of ports following the economic reforms, as seen with the Muuga Free Port and Sillamae Industrial Area in Estonia (since 1997), Riga and Ventspils Free Ports and Liepaia SEZ in Latvia (since 2002) and the Klaipeda FTZ and Business Park in Lithuania (since 1995).

Although North Korean port activity is comparatively inconsistent, the experiment of Rajin-Seonbong had immediate and strong effects on maritime trade in the early 1990s, as shown in Figure 7. Its port activity quadrupled in 1992, and such a growth is not yet achieved for the Baltic ports. This means that the potentials of North Korean ports can be rapid and enormous. The relative failure of the Rajin-Seonbong experiment was, in fact, determined by an unfavourable context – the zone was conceived too early – but recent Chinese interest in the development of the area is promising. As shown on the Figure 7, the port has rejuvenated within only two or three years, despite the limitations of land transport. That is, the betterment of demand and infrastructure shall make this free-zone more successful, based on transshipment rather than national trade. One can imagine in this context that the implementation of a new free-zone around Nampo, which is better connected to a larger and closer hinterland, can be a successful case on a longer term. This might explain the highest importance given to Nampo in terms of cost for developing infrastructures and special economic zone (US\$ 822 million), compared to other strategic areas like Rajin (US\$ 614 million), Wonsan (US\$ 575 million), Gaeseong (US\$ 544 million), Sinuiju (US\$ 495 million), and Mount Geumgang (US\$ 206 million) (Lee et al. 2004).

## **5. CONCLUSION**



Although Jo (2000) analyzed the evolution of urban and regional planning issues through the theory of the socialist developing countries, the North Korean maritime transportation appears to be somewhere between the Soviet model and the socialist developing country model. On one side, the evolution of North Korean maritime transportation has verified the Soviet model, with the moderate share of seaborne activity, the little importance of manufactured goods, and the spatial contraction of its maritime networks to its closest partners. On the other side, the evolution of Nampo has confirmed some aspects of the socialist developing country model, such as port concentration and modernization. Thus, Nampo is likely to follow the trend of socialist developing countries, i.e. to become the main load centre of the country, dedicated to the close core region of Pyongyang. This paper is the first time that maritime transport in North Korea is analyzed, based on first-hand data from Lloyd's group about vessel traffic by product and by trading partner. Once other usual sources such as KOTRA (Korea Trade Investment Promotion Agency) or JETRO (Japan External Trade Organization) are limited to national-level figures, previous studies of North Korean maritime trade have been limited in providing realistic measures of port activities (Kim et al, 1998), but this study could bring a micro perspective. Thus, this paper provides a base upon which further studies of North Korean trade and ports shall be carried. Finally, proposed measurements are not perfect. Though this paper provided a quantitative approach to the question of the modal split in North Korean trade, it is not enough to explain the share of sea trade among total trade. Further research should include the additional border trade by transport means (i.e. rail and road) and type of goods.

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Table 1: Evolution of urban population in North Korean cities (Unit: 000s inhabitants)

City	Province	2000s	1990s	1980s	1970s	1960s	1940s	1930s	1920s
Pyongyang	Pyongyang	2,992	2,741	2,355	1,500	840	388	235	120
Hamheung	South Hamgyeong	821	709	670	489	424	112	64	32
Cheongjin	North Hamgyeong	674	582	520	407	265	198	72	–
Nampo	South Pyongan	655	566	370	163	140	69	62	31
Sinuiju	North Pyongan	377	342	500	300	300	61	59	16
Heungnam	South Hamgyeong	349	–	–	260	150	144	–	–
Wonsan	Gangwon	347	308	398	350	275	79	67	37
Gaeseong	North Hwanghae	341	334	310	240	175	75	54	45
Sariwon	North Hwanghae	294	254	230	136	85	43	–	–
Haeju	South Hwanghae	265	240	213	163	140	63	30	15
Kanggyae	Chagangdo	258	234	211	163	130	26	–	–
Kimchaek	North Hamgyeong	227	–	281	265	265	62	–	–
Hyaesan	Yanggang	206	178	160	136	85	16	–	–
Songrim	North Hwanghae	153	102	108	96	85	53	–	13
Sinpo	South Hamgyeong	77	–	158	–	165	35	–	–

Sources: Jo and Adler, 2002b; Helders, 2006; Lahmeyer, 2006

Table 2: Evolution of North Korean maritime linkages, 1985–2005 (Unit: % DWT)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Indonesia	0,1	0,5	0,9	0,4	0,6	0,7	0,2	0,6	0,6	0,5	0,5	0,5	1,0	2,0	2,3	0,0	0,0	0,4	0,2	0,2	0,1
India	0,0	0,2	0,3	0,3	0,7	0,5	0,0	0,0	0,2	0,0	1,0	0,6	0,9	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,7
Malaysia	0,1	0,4	0,1	0,2	0,7	0,9	1,0	0,5	0,6	0,4	0,3	3,1	0,9	1,5	1,4	0,3	1,4	0,5	2,1	0,6	0,0
Philippines	0,1	0,4	0,6	0,3	0,3	0,2	0,4	0,8	0,0	1,1	0,0	1,0	0,3	0,4	0,3	0,1	0,0	0,6	0,1	0,9	0,0
Singapore	14,4	14,6	13,4	12,1	15,4	11,2	8,9	6,1	7,5	5,1	6,2	5,2	8,6	9,1	8,6	4,1	13,4	4,5	3,6	0,3	1,4
Thailand	1,1	1,4	0,9	1,2	0,8	1,0	4,0	1,9	1,2	0,3	0,3	0,3	1,7	0,4	0,6	1,4	0,6	0,9	0,1	0,4	0,2
Taiwan	0,6	2,3	0,3	0,6	0,5	0,8	1,3	2,3	3,7	3,7	0,3	2,7	4,3	2,1	5,1	2,1	7,6	6,9	5,5	6,4	3,2
Vietnam	0,6	0,3	0,5	1,2	0,0	1,6	0,4	0,0	0,1	0,3	0,0	0,6	0,6	0,0	0,6	0,5	0,4	0,0	0,3	0,0	0,1
Other S&E Asia	3,9	0,9	0,3	0,1	0,0	0,2	0,0	0,0	0,0	0,2	0,8	0,6	0,0	0,9	0,5	0,0	0,0	0,7	0,0	0,0	0,1
<b>Sub-total S&amp;E Asia</b>	21,0	21,1	17,2	16,5	19,0	17,1	16,3	12,1	13,9	11,7	9,2	14,6	18,4	16,4	19,5	8,5	23,4	14,6	11,8	8,8	5,7
China	13,7	16,5	20,8	24,9	28,8	24,2	21,1	19,0	24,9	22,3	19,9	27,6	25,2	16,3	11,3	10,5	6,2	14,3	20,9	12,4	11,4
Japan	37,9	46,5	41,5	48,1	39,3	44,7	44,8	53,1	41,6	48,6	38,4	36,4	36,8	42,6	21,5	27,0	33,6	35,2	20,1	18,0	12,2
South Korea	20,5	6,6	11,1	0,4	3,5	5,8	5,5	10,1	8,2	5,0	21,6	2,4	7,9	11,9	24,0	21,9	18,5	17,9	28,6	51,8	53,2
North Korea (domestic)	0,9	0,9	0,3	0,8	0,8	2,0	2,1	0,0	0,9	1,0	1,5	0,3	1,3	1,4	1,1	1,3	1,8	0,2	0,9	0,1	0,1
Russia / Far East	0,3	1,4	1,5	1,0	0,1	0,4	0,4	0,8	5,7	0,6	0,7	5,2	4,4	7,5	9,7	12,5	13,5	17,4	14,8	3,4	2,8
<b>Sub-total Northeast Asia</b>	73,3	71,9	75,3	75,2	72,4	77,1	74,0	83,0	81,2	77,5	82,0	71,8	75,6	79,8	67,6	73,3	73,5	85,0	85,3	85,7	79,6
Canada	0,6	0,7	0,0	0,2	0,0	0,0	3,0	1,1	1,0	0,0	0,0	0,0	0,3	0,0	0,0	0,2	0,6	0,0	0,0	1,2	0,3
USA	0,1	0,2	0,3	0,0	1,1	0,0	3,3	0,6	1,8	0,8	0,0	0,4	0,0	3,2	4,2	3,7	1,2	0,0	1,3	1,0	0,3
Panama / Latin America	1,0	0,9	0,9	2,1	1,2	1,2	0,8	0,7	1,1	0,8	1,4	1,9	1,1	0,0	4,1	0,5	0,9	0,3	0,0	0,0	0,0
Oceania	0,9	1,3	4,0	1,9	3,7	1,9	2,4	2,0	0,0	3,9	7,4	8,2	1,4	0,0	1,2	10,4	0,0	0,0	1,2	2,0	10,2
Middle-East	3,1	3,9	2,2	4,0	2,5	2,7	0,0	0,6	1,1	5,2	0,0	2,9	3,3	0,6	3,4	0,4	0,4	0,1	0,3	1,2	3,9
Others	0,0	0,0	0,0	0,0	0,0	0,0	0,2	0,0	0,0	0,0	0,0	0,3	0,0	0,0	0,0	3,0	0,0	0,0	0,0	0,1	0,0
<b>Sub-total rest of world</b>	5,7	7,0	7,4	8,3	8,6	5,9	9,7	4,9	4,9	10,8	8,8	13,6	6,0	3,8	13,0	18,3	3,1	0,4	2,8	5,5	14,7
<b>Sub-total socialist</b>	14,6	18,2	22,8	27,1	28,9	26,2	21,9	19,8	30,7	23,2	20,6	33,4	30,2	23,8	21,6	23,5	20,1	31,7	36,0	15,8	14,3
<b>Total</b>	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Lloyd's Marine Intelligence Unit, 2006

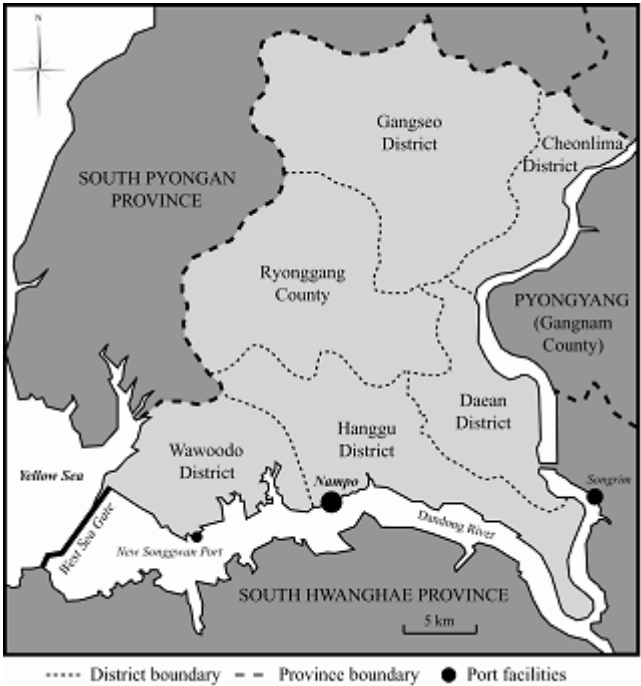
Table 3: Port concentration in developing and transition countries, 1990 and 2000  
(Unit: % of national seaborne trade)

Country	Main port (a)	Main city (b)	Road distance (km) from (a) to (b)	1990	2000
Jordan	Aqaba	Amman	300	677	504
Djibouti	Djibouti	Djibouti	0	108	390
Togo	Lome	Lome	0	120	207
Myanmar	Yangon	Yangon	0	279	173
Benin	Cotonou	Cotonou	0	83	148
Bahrain	Mina Sulman	Manama	0	24	141
Romania	Constantza	Bucharest	260	172	139
Estonia	Tallinn	Tallinn	0	N/A	123
Bangladesh	Chittagong	Dhaka	460	75	120
Ghana	Tema	Accra	26	63	115
Latvia	Riga	Riga	0	N/A	111
Namibia	Walvis Bay	Windhoek	300	95	105
French Guiana	Degrad-des-Cannes	Cayenne	46	347	103
Cote D'ivoire	Abidjan	Abidjan	0	102	102
El Salvador	Acajutla	San Salvador	28	96	102
Senegal	Dakar	Dakar	0	104	101
Kenya	Mombasa	Nairobi	500	93	100
Cameroon	Douala	Douala	0	27	100
Lebanon	Beirut	Beirut	0	79	100
Guinea	Conakry	Conakry	0	38	100
Gambia	Banjul	Banjul	0	97	100
Brunei Darussalam	Muara	Bandar Seri Begawan	15	77	99
Eritrea	Massawa	Asmara	70	23	95
Cambodia	Sihanoukville	Phnom Penh	214	N/A	91
Costa Rica	Puerto Limon	San Jose	142	129	91
Honduras	Puerto Cortes	Tegucigalpa	242	110	90
United Arab Emirates	Dubai	Dubai	0	18	89
Philippines	Manila	Manila	0	38	85
Sudan	Port Sudan	Khartoum	800	74	73
Peru	Callao	Lima	30	182	70
Pakistan	Karachi	Karachi	0	116	70
Bulgaria	Bourgas	Sofia	400	41	69
Malaysia	Port Klang	Kuala Lumpur	42	33	64
Saudi Arabia	Jeddah	Riyadh	1000	7	61
<b>North Korea</b>	<b>Nampo</b>	<b>Pyongyang</b>	<b>40</b>	<b>37</b>	<b>59</b>
Mozambique	Maputo	Maputo	0	43	58
Ghana	Takoradi	Accra	200	28	57
Tanzania	Dar-es-Salaam	Dodoma	460	94	55
Guatemala	Puerto Quetzal	Guatemala City	257	28	55
Nicaragua	Corinto	Managua	42	29	54

Source: Ducruet, 2004

(1) values for Nampo are for 1994 and 2004

Figure 1: Location map of Nampo until 2004



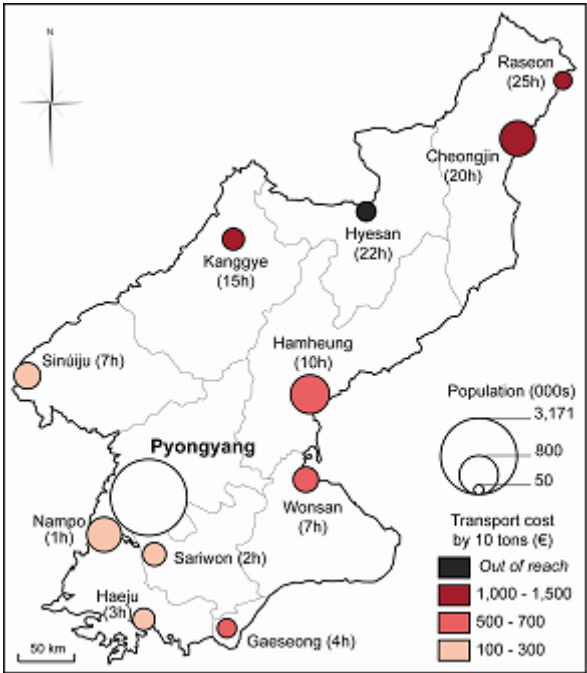
Source: authors

Figure 2: Urbanization and land-use in the port city of Nampo



Sources: Atlas of North Korea, 1997; Google, 2006

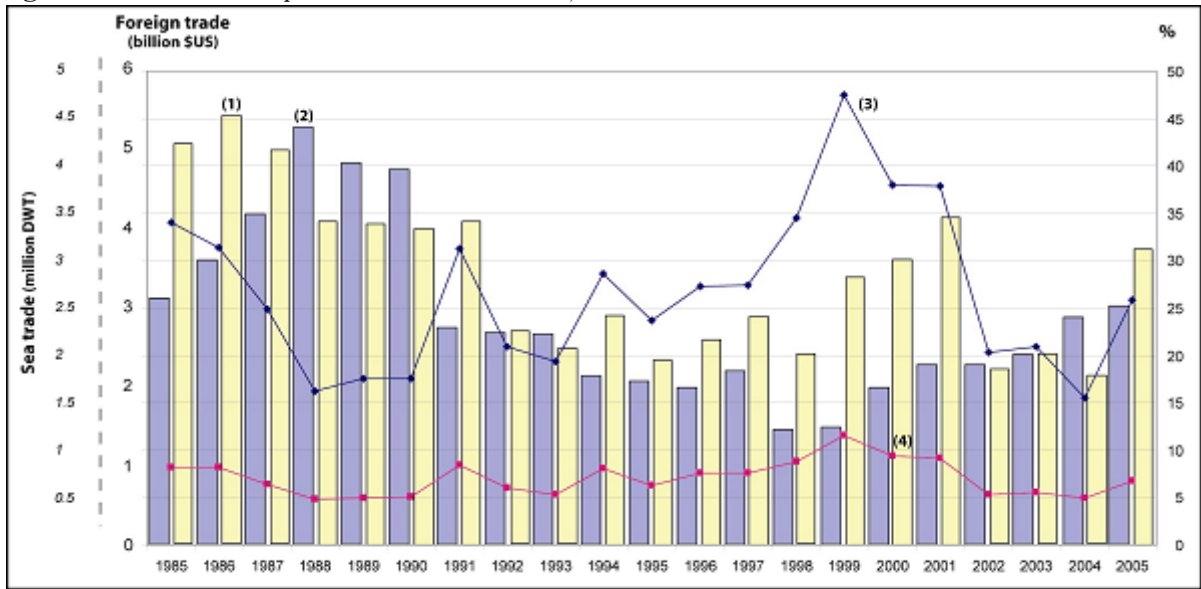
Figure 3: Travel time and cost by truck from Pyongyang to main cities



Sources: World Food Programme, 2000; Helders, 2006; Korea Strategic Data, 2006

(1) This company cooperates with a French freight forwarder in Pyongyang, North Korea. With their permission, this real travel time and cost can be provided. Since this real time and cost reflect current situation of trucking in North Korea, estimated time will be different depending on rehabilitation of infrastructure and institutional improvement.

Figure 4: Sea trade importance in total trade, 1985–2005

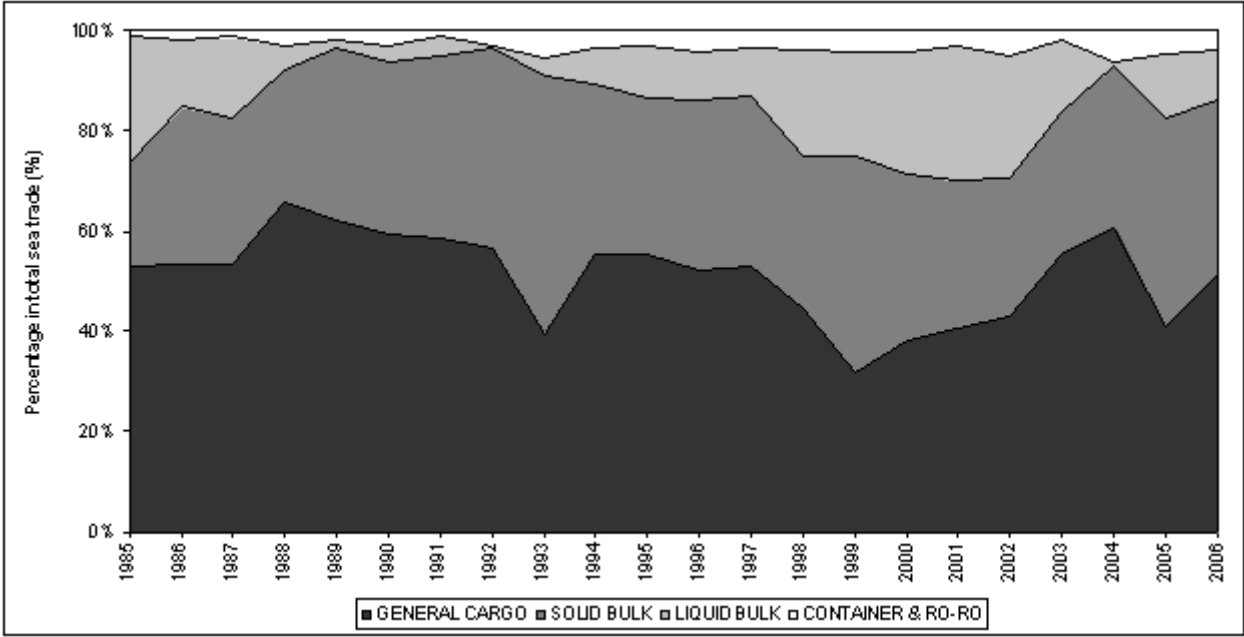


(1) Sea trade (2) Total trade (3) Share of maritime trade in total trade (4) Share of maritime trade in total trade (weighted tons)

Sources: Ministry of Unification, 2006; Lloyd's Marine Intelligence Unit, 2006

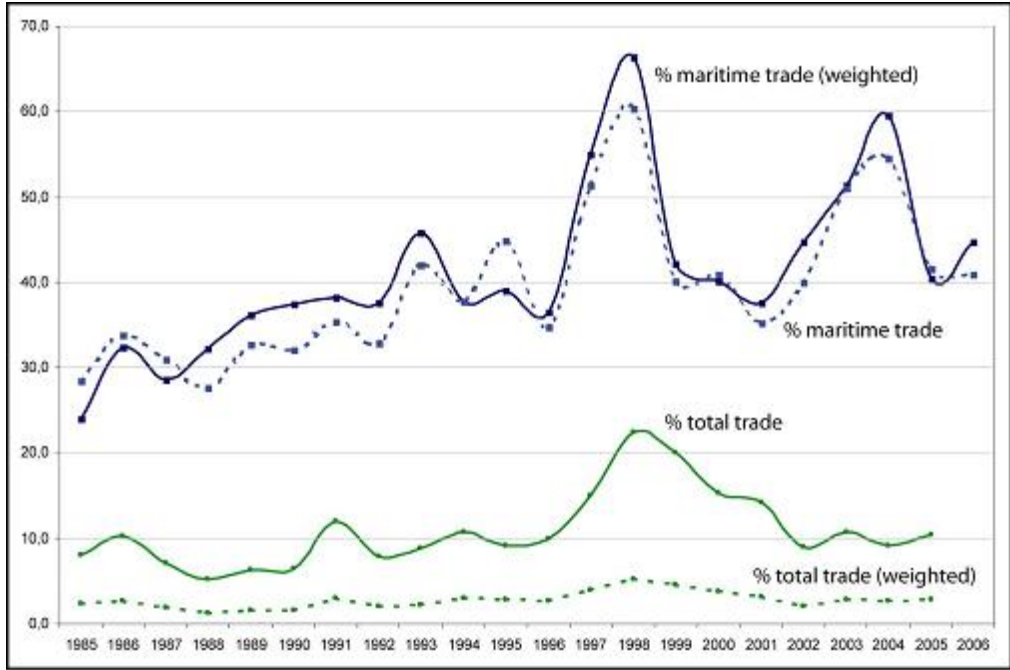
(1) DWT: Deadweight Tonnage, summed from the capacity of the vessels

Figure 5: Sea trade evolution by product, 1985-2006 (Unit: % DWT)



Sources: Lloyd's Marine Intelligence Unit, 2006

Figure 6: Trade concentration in Nampo, 1985-2005 (Unit: %)

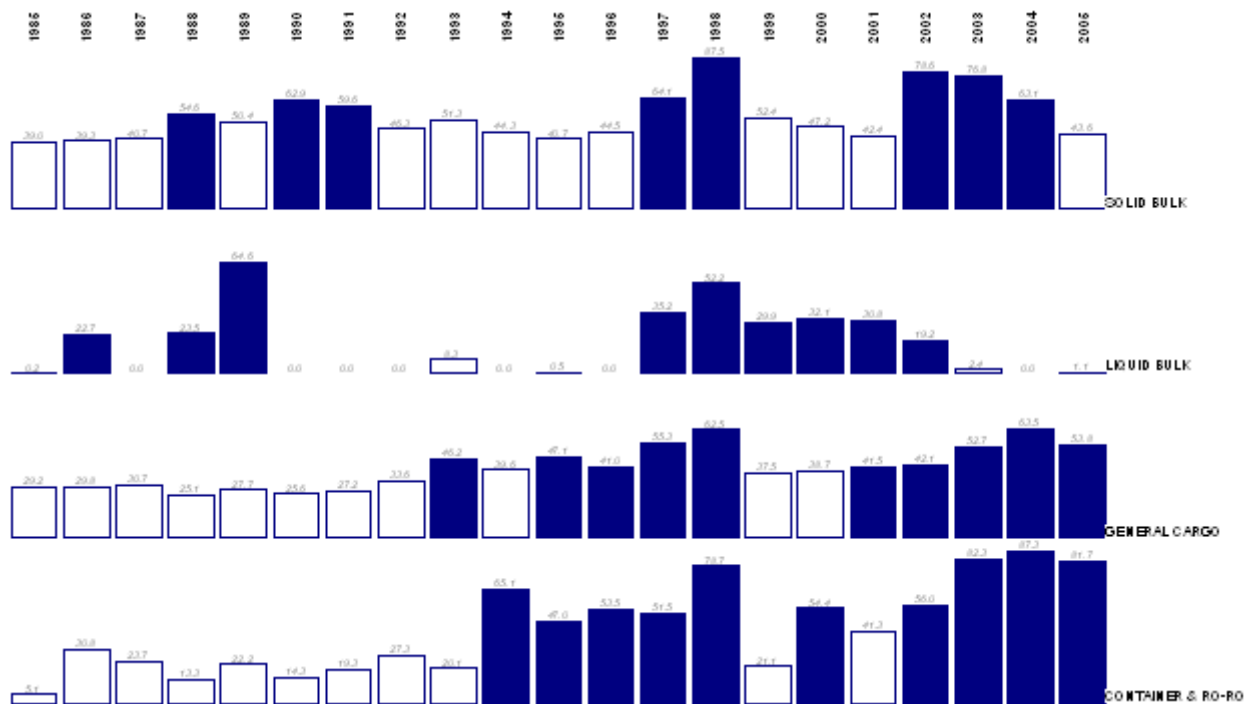


Sources: Ministry of Unification, 2006; Lloyd's Marine Intelligence Unit, 2006

(1) Figures for 2006 end in August



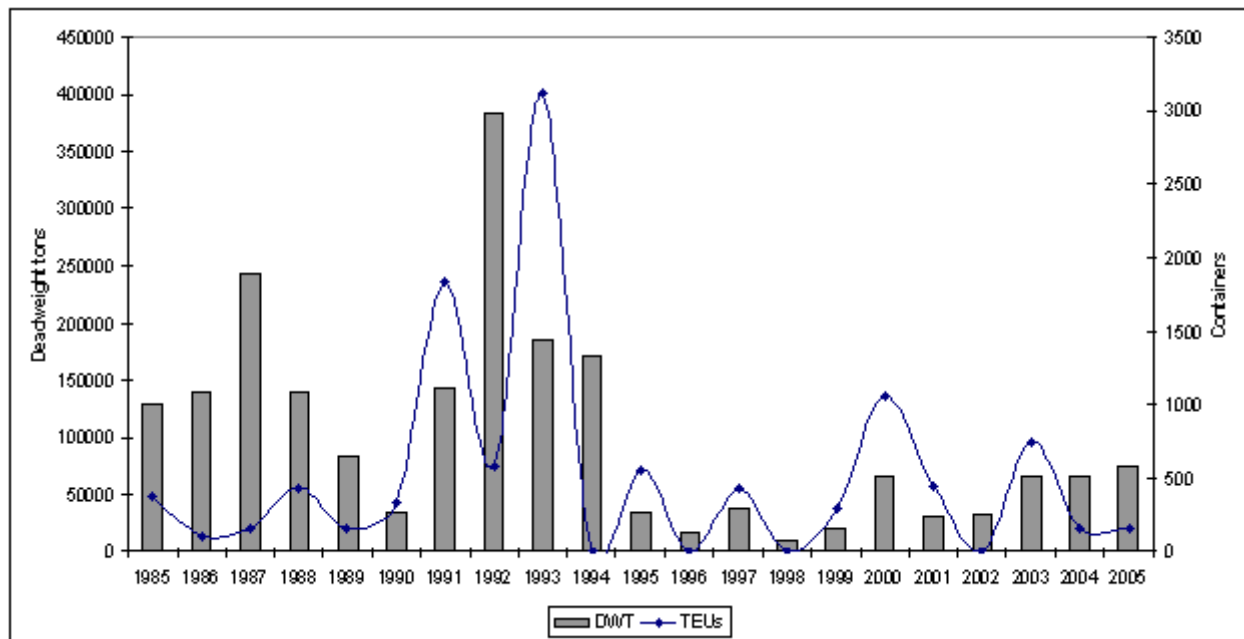
Figure 7: Trade concentration in Nampo by product, 1985–2005 (Unit: % DWT)



Source: Lloyd's Marine Intelligence Unit, 2006

(1) bold values are those superior to the period's average

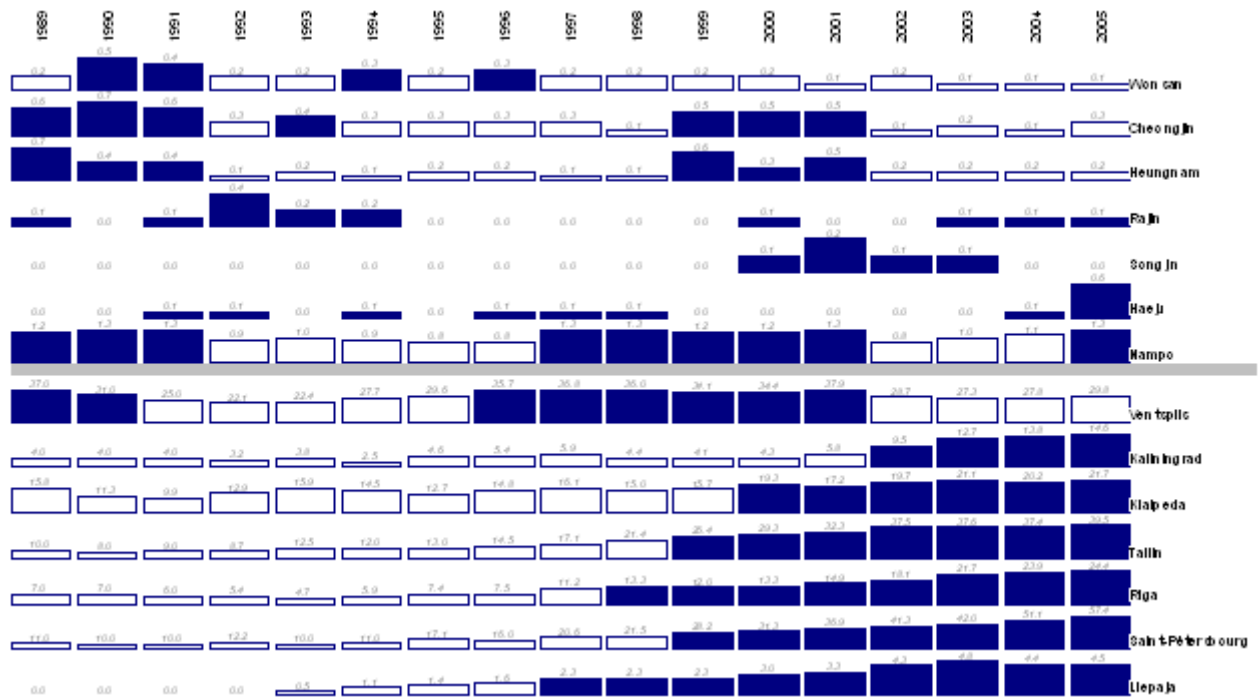
Figure 8: Port traffic evolution in Rajin, 1985–2005



Source: Lloyd's Marine Intelligence Unit, 2006

(1) TEUs: Twenty-Foot Equivalent Units, the standard measurement for container traffics

Figure 9: Port traffic evolution in Baltic and North Korean ports, 1989–2005  
(Unit: million metric tons)



Source: Serry, 2006; Lloyd's Marine Intelligence Unit, 2006

(1) deadweight tons have been adjusted to metric tons by using the official conversion coefficient of 1.016047

(2) bold values are those superior to the period's average